

# PATENT SPECIFICATION



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## COMPLETE SPECIFICATION.

### Improvements in and relating to Belt Drives.

We, FRANZ CLOUTH RHEINISCHE GUMMI-  
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102-116, Niehlerstrasse, Köln-Nippes,  
Germany, a German Company, and  
5 "ISDEG" INDUSTRIE-UND SCHIFFSBAU-  
GESELLSCHAFT MIT BESCHRÄNKTER HAF-  
TUNG, of 40, Linkstrasse, Berlin, W. 9.,  
Germany, a German Company, do hereby  
declare the nature of this invention and  
10 in what manner the same is to be per-  
formed, to be particularly described and  
ascertained in and by the following state-  
ment:—

This invention relates to a belt drive,  
15 more particularly for a V-belt, comprising  
a large working pulley having only a  
single groove, a smaller working pulley  
having a plurality of grooves, and an  
20 intermediate pulley having one groove less  
than the smaller working pulley, wherein  
the belt passes directly from the two sides  
of the larger pulley to the two outermost  
grooves of the smaller working pulley,  
and passes round a groove in the inter-  
25 mediate pulley between each two adjacent  
grooves of the smaller working pulley.

The power transmitted by a V-belt  
depends entirely on its friction against  
the grooves of the belt pulleys. The  
30 danger of slipping is naturally particu-  
larly great with small belt pulleys, owing  
to the small angle embraced by the belt.  
For this reason it is in many cases neces-  
sary to arrange several V-belts next to one  
35 another, although the cross-section of a  
single belt would be amply sufficient for  
transmitting the power. A tightening  
pulley, such as is used in the case of flat  
belts, only slightly increases the angle of  
40 contact, and is of little advantage, more  
particularly with V-belts, as such belts  
bend less readily in the opposite direction,  
as required by the tightening pulley, and  
45 as their life is thereby very adversely  
affected.

A belt drive for a motor cycle or light  
car has already been proposed comprising a  
large driven pulley having only a single  
groove, a smaller driving pulley having  
50 two grooves, and an intermediate pulley  
having one groove, wherein the belt passes  
directly from the two sides of the larger  
pulley to the two grooves of the smaller  
working pulley and passes round the

groove in the intermediate pulley between 55  
its two passages round the smaller work-  
ing pulley.

According to the present invention the  
smaller working pulley has more than two  
grooves, and the intermediate pulley 60  
therefore has more than one groove.

According to an alternative form of the  
invention the transmission of power is  
assisted by connecting the intermediate  
pulley with the driven pulley by means of 65  
a separate belt, chain or the like.

The intermediate pulley may also be  
utilised in other ways along with the  
driven pulley for the performance of  
work. 70

The accompanying drawing illustrates  
two constructional forms of the invention,  
Figures 1 and 2 being views at right  
angles to one another of one constructional  
form and Figure 3 showing another con- 75  
structional form.

In the examples shown in the drawing,  
*a* is the larger working pulley, *b* the  
smaller working pulley and *c* the inter-  
mediate pulley. Either the pulley *a* or 80  
the pulley *b* may be the driving pulley.

In Figures 1 and 2 the V-belt is guided  
in the following manner:—From the  
pulley *b* one stretch *d* runs directly to the  
pulley *a*, from which the stretch *e* leads to 85  
the intermediate pulley *c*, and thence,  
forming the stretch *f*, to the second groove  
of the pulley *a*, from which the stretch *g*  
leads back to the pulley *b*.

In order to assist the transmission of 90  
power the pulley *c* is connected with the  
pulley *a* by a chain *h*, meshing with  
chain wheels *i* and *k* keyed to the shafts  
of the pulleys *c* and *a* respectively.

In Figure 3 the smaller working pulley 95  
*a'* is shown with three grooves and the  
intermediate pulley *c'* with two grooves.  
The stretch *d* of the belt runs from the  
larger pulley *b'* to an outer groove of the  
pulley *a'*, the stretch *e* from the pulley 100  
*a'* to the pulley *c'*, the stretch *f* from the  
pulley *c'* to the middle groove of the  
pulley *a'*, the stretch *g* from the middle  
groove of the pulley *a'* to the second  
105 groove of the pulley *c'*, the stretch *l* from  
the intermediate pulley to the third groove  
in the smaller working pulley and the  
stretch *m* from the pulley *a'* back to the

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large working pulley  $b^1$ .

It will be seen from Figure 3 that the axes of the pulleys  $b^1$  and  $c^1$  are so inclined to the plane containing the axis of the working pulley  $a^1$  that the planes containing the grooves in the pulley  $a^1$  pass approximately through the points at which the various stretches of the belt enter and leave the grooves in the pulleys  $b^1$  and  $c^1$ . The belt is slightly twisted, but this is in no way detrimental.

The distance between the pulleys may be made adjustable the arrangement being preferably such that the intermediate pulley  $c$  or  $c^1$  is capable of sliding or rocking. It may be at any distance from the pulley  $a$  or  $a^1$ . The intermediate pulley may even be on the further side of the pulley  $b$  or  $b^1$ .

Through the arrangement according to the present invention the contact angle of the V-belt on the pulley  $a$  becomes considerably greater and may even be manifolded. The power to be transmitted can, therefore, be increased as far as the tensile strength of the belt cross-section will allow. In most cases the friction of the V-belt will be sufficiently increased by the arrangement shown, so that it will not be necessary to take the belt backwards and forwards more often between the pulleys.

When the present arrangement is used for flat belts, lateral belt guides could be dispensed with. The belt may, of course, be used crossed. For transmitting greater power several belt drives of the kind described above can work simultaneously next to one another.

An arrangement has already been proposed for transmitting power by means of a round endless belt, a large working pulley having a single groove, a small working pulley having a plurality of grooves, three for example, an intermediate pulley having the same number of grooves as the small working pulley, and a single-grooved yieldingly mounted pulley for taking up the slack in the belt, wherein the belt passes directly between

one side of the large pulley and one end groove of the small working pulley, but passes round the yieldingly mounted pulley on its way between the other side of the large pulley and an end groove of the intermediate pulley.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A belt drive, more particularly for a V-belt, comprising a large working pulley having only a single groove, a smaller working pulley having three or more grooves, and an intermediate pulley having one groove less than the smaller working pulley, wherein the belt passes directly from the two sides of the larger pulley to the two outermost grooves of the smaller working pulley, and passes round a groove in the intermediate pulley between each two adjacent grooves of the smaller working pulley.

2. A belt drive, more particularly for a V-belt, comprising a large working pulley having only a single groove, a smaller working pulley having a plurality of grooves, and an intermediate pulley having one groove less than the smaller working pulley, wherein the belt passes directly from the two sides of the larger pulley to the two outermost grooves of the smaller working pulley, and passes round a groove in the intermediate pulley between each two adjacent grooves of the smaller working pulley, characterised by the feature that the driven pulley and the intermediate pulley are connected together by a separate belt, chain or the like.

3. A belt drive as claimed in claim 1 or 2, characterised by the feature that power is taken from the third or intermediate pulley for the performance of work.

Dated this 25th day of June, 1930.

MARKS & CLERK.

[This Drawing is a reproduction of the Original on a reduced scale.]

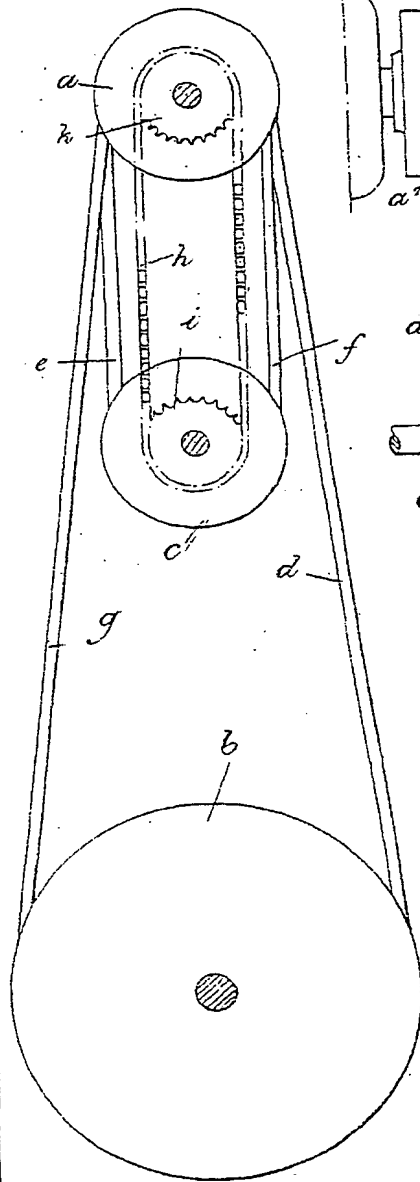


Fig. 1.

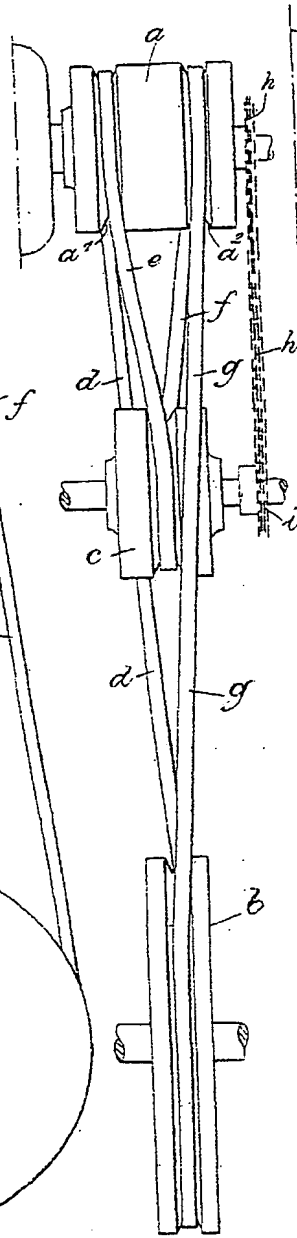


Fig. 2.

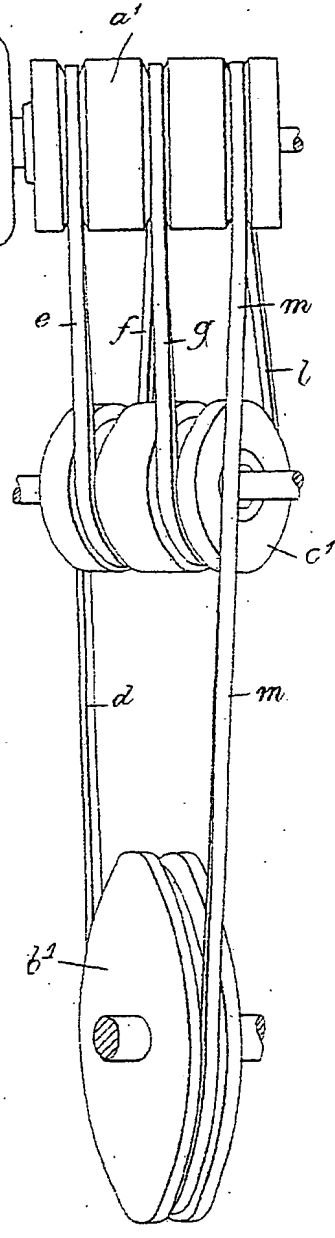


Fig. 3.